

What is claimed is:

[Claim 1] 1. A method of fabricating a structure, comprising:

- (a) forming a trench in a substrate;
- (b) depositing a first layer of polysilicon on a surface of said substrate, said first layer of polysilicon filling said trench;
- (c) chemical-mechanical-polishing said first layer of polysilicon at a first temperature to expose said surface of said substrate;
- (d) removing an upper portion of said first layer of polysilicon from said trench;
- (e) depositing a second layer of polysilicon on said surface of said substrate, said second layer of polysilicon filling said trench; and
- (f) chemical-mechanical-polishing said second layer of polysilicon at a second temperature to expose said surface of said substrate, said second temperature different from said first temperature.

[Claim 2] 2. The method of claim 1, wherein said first temperature is higher than said second temperature.

[Claim 3] 3. The method of claim 1, wherein said first temperature is between about 100°F to about 140°F and said second temperature is between about 80°F to about 100°F.

[Claim 4] 4. The method of claim 1, wherein said first temperature is about 120°F and said second temperature is about 90°F.

[Claim 5] 5. The method of claim 1, wherein step (a) is followed by step (b), step

(b) is followed by step (c), step (c) is followed by step (d), step (d) is followed by step (e) and step (e) is followed by step (f).

[Claim 6] 6. The method of claim 1, wherein said first layer of polysilicon comprises N-doped polysilicon and said second layer of polysilicon comprises N-doped polysilicon.

[Claim 7] 7. The method of claim 1,
wherein said substrate includes an uppermost polishing stop layer;
and
step (a) including forming said trench through said polishing stop
layer.

[Claim 8] 8. The method of claim 1, further including, between steps (a) and (b),
forming a dielectric layer on a sidewall of said trench.

[Claim 9] 9. The method of claim 1,
step (c) further including: pressing a top surface of said first layer of polysilicon against a rotating first polishing pad while dispensing a first slurry on a top surface of said first polishing pad, said first polishing pad maintained at said first temperature; and
step (f) further including: pressing a top surface of said second layer of polysilicon against a rotating second polishing pad while dispensing a second slurry on a top surface of said second polishing pad, said second polishing pad maintained at said second temperature.

[Claim 10] 10. The method of claim 9, further including:
dispensing said first slurry at said first temperature; and

dispensing said second slurry at said first temperature.

[Claim 11] 11. A method of fabricating a structure, comprising:

- (a) forming an array of trenches in a substrate;
- (b) depositing a first layer of polysilicon on a surface of said substrate, said first layer of polysilicon filling said trenches;
- (c) chemical-mechanical-polishing said first layer of polysilicon at a first temperature to expose said surface of said substrate, said first layer of polysilicon in said trenches dished into said trench a first distance from surface of said substrate;
- (d) removing an upper portion of said first polysilicon from each of said trenches;
- (e) depositing a second layer of polysilicon on said surface of said substrate, said second layer of polysilicon filling said trenches; and
- (f) chemical-mechanical-polishing said second layer of polysilicon at a second temperature to expose said surface of said substrate, said second temperature different from said first temperature, said second layer of polysilicon in said trenches dished into said trench a second distance from surface of said substrate, said first distance greater than said second distance.

[Claim 12] 12. The method of claim 11, wherein said first temperature is higher than said second temperature.

[Claim 13] 13. The method of claim 11, wherein said first temperature is between about 100°F to about 140°F and said second temperature is between about 80°F to about 100°F.

[Claim 14] 14. The method of claim 11, wherein said first temperature is about 120°F and said second temperature is about 90°F.

[Claim 15] 15. The method of claim 11, wherein step (a) is followed by step (b), step (b) is followed by step (c), step (c) is followed by step (d), step (d) is followed by step (e) and step (e) is followed by step (f).

[Claim 16] 16. The method of claim 11, wherein said first layer of polysilicon comprises N-doped polysilicon and said second layer of polysilicon comprises N-doped polysilicon.

[Claim 17] 17. The method of claim 11, wherein said substrate includes an uppermost polishing stop layer; and step (a) including forming said trench through said polishing stop layer.

[Claim 18] 18. The method of claim 1, further including, between steps (a) and (b), forming a dielectric layer on sidewalls of said trenches.

[Claim 19] 19. The method of claim 11, step (c) further including: pressing a top surface of said first layer of polysilicon against a rotating first polishing pad while dispensing a first slurry on a top surface of said first polishing pad, said first polishing pad maintained at said first temperature; and step (f) further including: pressing a top surface of said second layer of polysilicon against a rotating second polishing pad while dispensing a second slurry on a top surface of said second polishing pad, said

second polishing pad maintained at said second temperature.

[Claim 20] 20. The method of claim 19, further including:

dispensing said first slurry at said first temperature; and
dispensing said second slurry at said first temperature.

[Claim 21] 21. A method of fabricating memory cell, comprising:

- (a) forming a trench in a substrate and forming a dielectric layer on a sidewall of said trench;
- (b) depositing a first layer of polysilicon on a surface of said substrate, said first layer of polysilicon filling said trench;
- (c) chemical-mechanical-polishing said first layer of polysilicon at a first temperature to expose said surface of said substrate;
- (d) removing an upper portion of said first polysilicon from said trench;
- (e) depositing a second layer of polysilicon on said surface of said substrate, said second layer of polysilicon filling said trench;
- (f) chemical-mechanical-polishing said second layer of polysilicon at a second temperature to expose said surface of said substrate, said second temperature different from said first temperature;
- (g) removing an upper portion of said second layer of polysilicon from said trench and refilling said trench with an insulator; and
- (h) forming a NFET in said substrate and adjacent to said trench, a source of said NFET in physical and electrical contact with said second layer of polysilicon in said trench.

[Claim 22] 22. The method of claim 21, wherein said first temperature is higher than said second temperature.

[Claim 23] 23. The method of claim 21, wherein said first temperature is between about 100°F to about 140°F and said second temperature is between about 80°F to about 100°F.

[Claim 24] 24. The method of claim 1, wherein said first temperature is about 120°F and said second temperature is about 90°F.

[Claim 25] 25. The method of claim 21, wherein step (a) is followed by step (b), step (b) is followed by step (c), step (c) is followed by step (d), step (d) is followed by step (e) and step (e) is followed by step (f).

[Claim 26] 26. The method of claim 21, wherein said first layer of polysilicon comprises N-doped polysilicon and said second layer of polysilicon comprises N-doped polysilicon.

[Claim 27] 27. The method of claim 21, wherein said substrate includes an uppermost polishing stop layer; and step (a) including forming said trench through said polishing stop layer.

[Claim 28] 28. The method of claim 21, further including, forming a heavily doped N+ region in said substrate adjacent to a lower portion of said dielectric layer on said sidewall of said trench.

[Claim 29] 29. The method of claim 21, step (c) further including: pressing a top surface of said first layer of polysilicon against a rotating first polishing pad while dispensing a first

slurry on a top surface of said first polishing pad, said first polishing pad maintained at said first temperature; and
step (f) further including: pressing a top surface of said second layer of polysilicon against a rotating second polishing pad while dispensing a second slurry on a top surface of said second polishing pad, said second polishing pad maintained at said second temperature.

[Claim 30] 30. The method of claim 29, further including:

dispensing said first slurry at said first temperature; and
dispensing said second slurry at said second temperature.